CENTER ROUTING SLIP

FROM	DATE
TSSG/ESD/TEB	4 Feb 70

TO		INITIALS	DATE
DIRECTOR			
DEP/DIRECTOR			
EXEC/DIRECTOR			
SPECIAL ASST			
ASST TO DIR			
HISTORIAN			
CH/PPBS			
DEP CH/PPBS			
EO/PPBS			
CH/IEG			
DEP CH/IEG			
EO/IEG			
CH/PSG			
DEP CH/PSG			
EO/PSG			
CH/TSSG	1.	JWL	2/9
DEP CH/TSSG			
EO/TSSG			
CH/SSD/TSSG			
PERSONNEL			
LOGISTICS			
TRAINING			
RECORDS MGT			
SECURITY			
FINANCE			
DIR/IAS/DDI			
CH/DIAXX-4			
CH/DIAAP-9			

REMARKS

2. TSSG/PPS

Declass Review by NGA.

John C
The less heat the better. Do we really need it? Is this preheater problem also some problem that exists in the 1540.
[initials]

C/RED —> lets be
C/EPD —> certain to schedule similar tests on prototype 1540s. If about same results I strongly suggest

IP FM 30 (12-69) - OBSOLETE PREVIOUS EDITIONS

Consider this option for
pre-heater entirely on production
items. Questions:

1) What is total, if any, difference
in power regm., with & w/o heater?

2) Why don't we eliminate heater
on M/M-47B100 bottle now?

3) If we do, what is change in
power needed?

4) If eliminated from production
1540s, what is price differential?

JWC

9 Feb 70

SECRET

TSSG/ESD/TEB-2/70
30 January 1970

MEMORANDUM FOR: Chief, Research and Engineering Division, TSSG

25X1 ATTENTION : [redacted]

THROUGH : Chief, Engineering Support Division, TSSG

SUBJECT : Memorandum Test Report on the Preheat System of a
25X1 [redacted] MIM-47B100 Light Table

1. INTRODUCTION

25X1 1.1 It is the understanding of TEB that the purpose of the preheat system on the [redacted] liquid-cooled light tables is to obtain maximum luminance (photometric brightness) in the shortest practicable time. A question arose within TEB as to whether or not the preheat system significantly reduces the warm-up time. As a result, a test was devised and performed on the preheat system of a model MIM-47B100 Light, serial #00063.

1.2 The table which has been tested was delivered by the manufacturer the day before the test began. The manufacturer had been requested to make sure the preheater was functioning properly on this particular table, and he submitted a signed and dated statement to that effect.

1.3 For the "Preheat on" test, the heater was left on overnight and during the test which began when the illumination was turned on the following morning. The heater was left off the following night and during the "Preheat off" test which began the morning after that. All other conditions were essentially the same during the two days of testing.

2. SUMMARY OF TEST RESULTS

2.1 Figure 1 presents comparative "preheat on" and "preheat off" illumination vs time curves for the left stage. Figure 2 is for the right stage.

SECRET

2.2 By averaging the minor differences between left and right stages and reporting the luminance as a percentage of the rated 3000 foot-lamberts, the following table effectively summarizes the results:

TABLE 2.2

Elapsed Time (min)	Luminance in % of Rated 3000 ft-lamberts		Δ %
	Preheat off	Preheat on	
5	50%	70%	20
10	65%	80%	15
15	79%	87%	8
30	94%	98%	4
40	98%	100%	2
50	100%	100%	0

2.3 Figure 3 shows that the thermostatically controlled electric heater is installed in the heat exchanger located behind the lamp housing. There is a coolant-circulating pump, but it is on only when the lamps are on. Therefore, preheating of the coolant within the lamphousing can occur only through natural convection. The test results show that after the heater was left on all night, the heater housing temperature was 100°F, the hoses between heat exchanger and lamphouse were 76°F, and the stage glass over the lamphouse was 73°F, only one degree above ambient.

2.4 The detailed test data is not included. It is available in the TEB project file.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 If the heater system in the table which has been tested was truly performing at its best, then the results presented herein seem to indicate that the heater is hardly worthwhile. It shows what could be considered a significant increase in luminance only during the first ten minutes of operation.

3.2 TEB recommends the following:

a) If there is any doubt as to the performance of the heater system which was tested, let's repeat the test on additional tables. The manufacturer should be queried on this.

b) If the heater performance is judged to be up to design expectations, consult with the operating divisions regarding their opinion as to action to be taken. TEB suggests either eliminating the heater on future purchases or require additional development to further improve the luminance to elapsed time relationship. If additional development is selected, the following alternative suggestions are offered for consideration:

1) A heating element within the fluid chamber of each lamphouse would be a better location if convection is to be relied upon for pre-heating.

2) Make the circulating pump run whenever the pre-heater is energized.

3) Don't try to use it as a preheater. Simply provide a more powerful heating element and energize it through its thermostat only when the lamp is turned on.

25X1

[redacted]

Distribution:
Orig. & 2 - NPIC/TSSG/ESD/TEB
1 - Addressee
1 - NPIC/TSSG/RED (Project Officer)
1 - NPIC/TSSG/PPS (Through Ch/TSSG)
25X1 1 - NPIC/IEG/OSS [redacted]
25X1 1 - DDI/IAS
1 - DIAAP-9
1 - Army/SPA

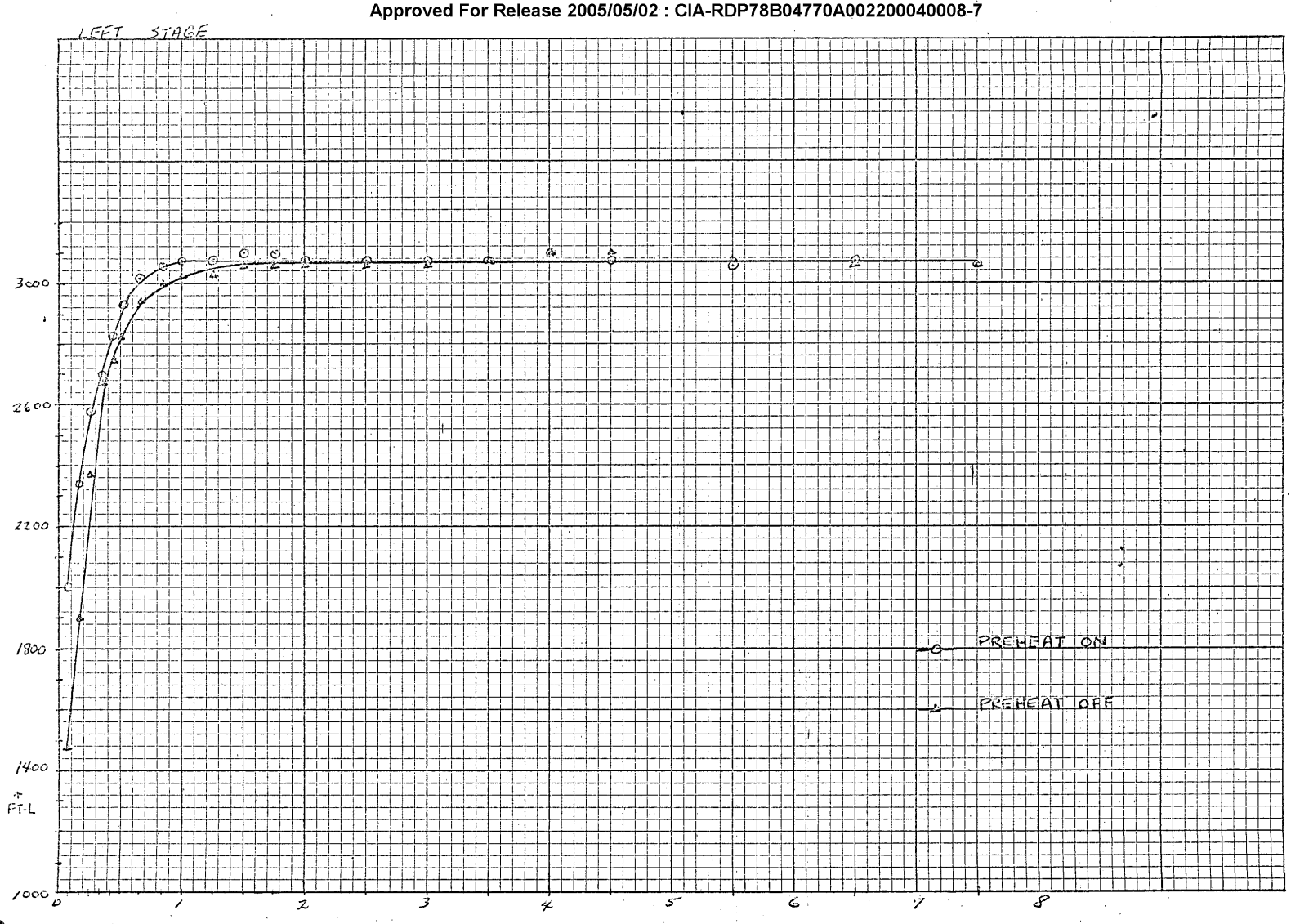


Figure 1.

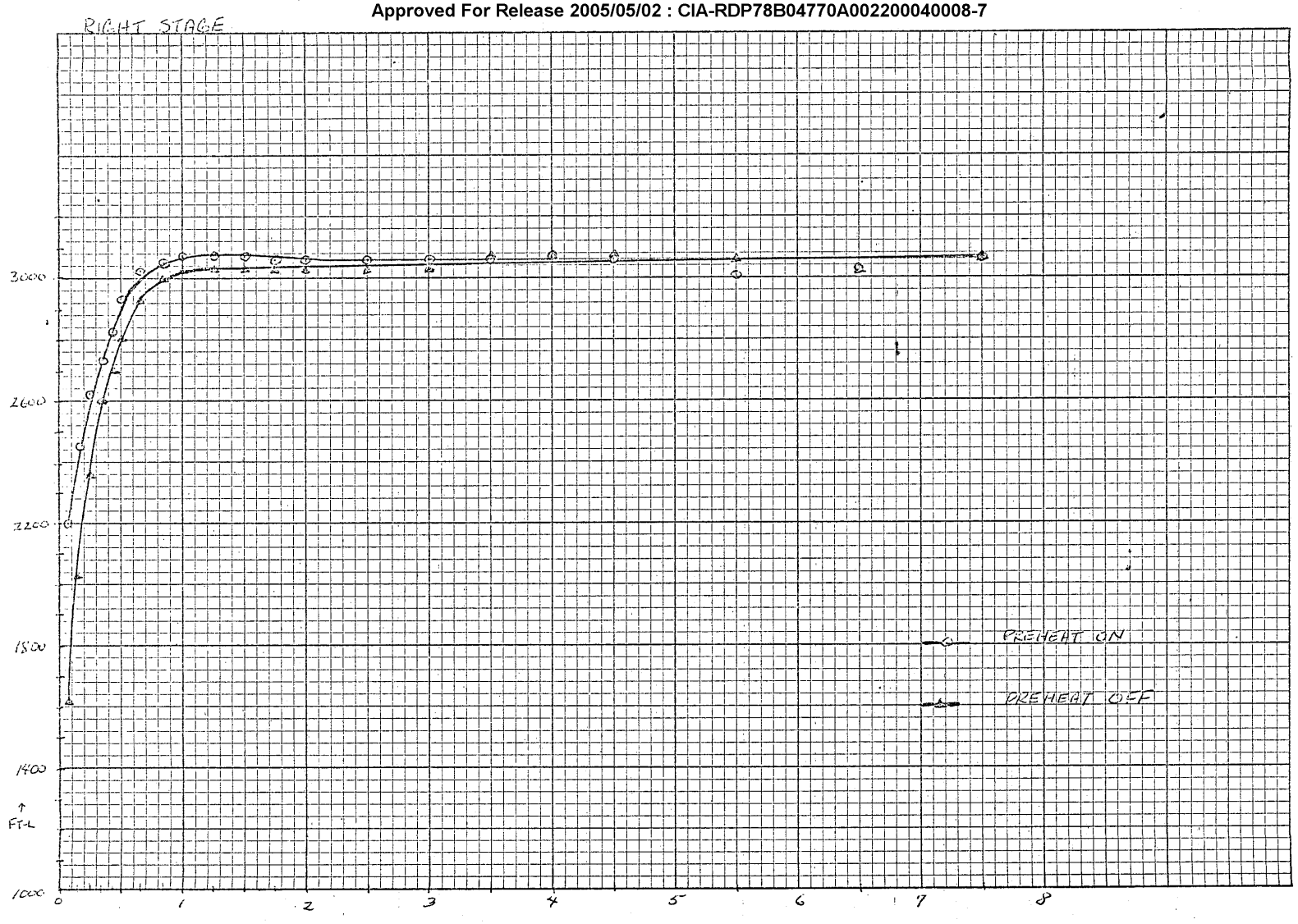
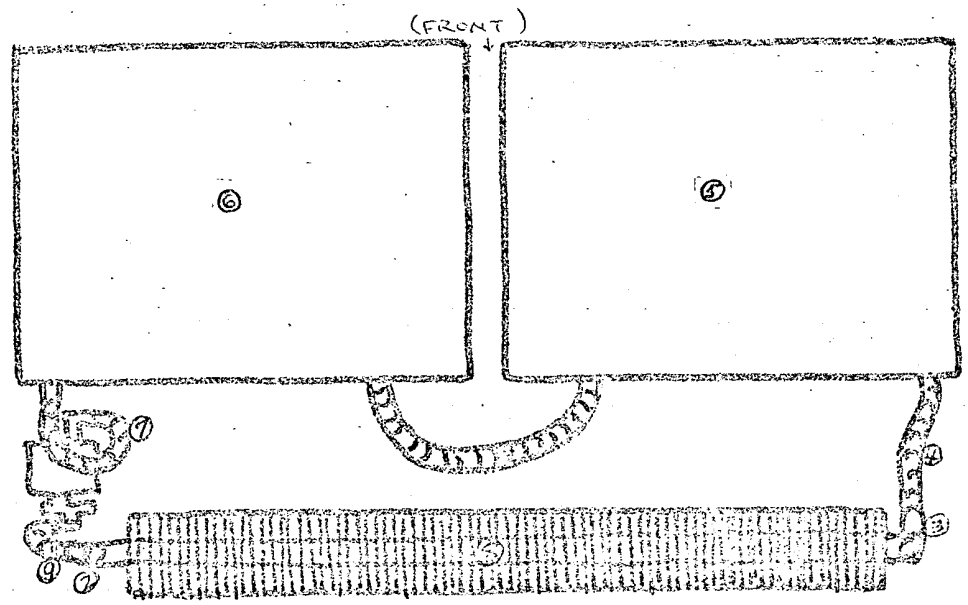
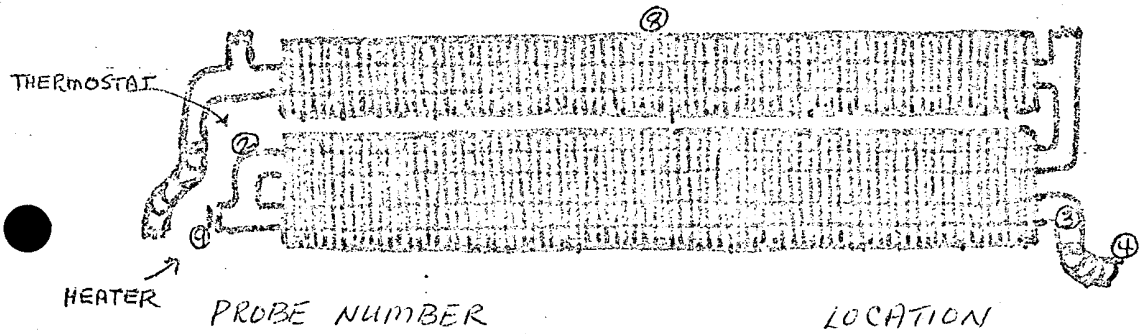


FIGURE 2.

PREHEAT - COOLING SYSTEM
PROBE LOCATIONS





PROBE NUMBER	LOCATION
1	AMBIENT
2	THERMOSTAT
3	LEFT (COPPER) PIPE
4	LEFT TUBE
5	LEFT STAGE
6	RIGHT STAGE
7	RIGHT TUBE (BEFORE PUMP)
8	TOP OF COOLING SYSTEM
9	HEATER (RIGHT SIDE)